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January 2, 2002

Mr. Roy Crossland
START Project Officer
U.S. Environmental Protection Agency, Region 7
901 North 5th Street
Kansas City, Kansas 66101

Subject: Quality Assurance Project Plan (QAPP)
Agromac-Lockwood Operating Unit Number 2, Gering, Nebraska
U.S. EPA Region 7 START 2, Contract No. 68-S7-01-41, Task Order No. 0008.10
Task Monitor: Kevin Larson, On-Scene Coordinator

Dear Mr. Crossland:

Tetra Tech EM Inc. is submitting this QAPP for an Integrated Site Investigation/Removal Site Evaluation at the above-referenced location.

If you have any questions or comments regarding this QAPP, please call the project manager at (913) 495-3906.

Sincerely,

Curt Enos
START Project Manager

Hieu Q. Vu, PE, CHMM
START Program Manager

Enclosure



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QUALITY ASSURANCE PROJECT PLAN
AGROMAC-LOCKWOOD OPERATING UNIT NUMBER 2, GERING, NEBRASKA

Superfund Technical Assessment and Response Team (START) 2

Contract No. 68-S7-01-41, Task Order No. 0008.10

Prepared For:

U.S. Environmental Protection Agency
Region 7
901 North 5th Street
Kansas City, Kansas 66101

January 2, 2002

Prepared By:

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Approved by:



Curt Enos, Tetra Tech START Project Manager

1/02/02

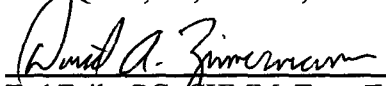
Date



Hieu Q. Vu, PE, CHMM, Tetra Tech START Program Manager

1/02/02

Date



for Ted Faile, PG, CHMM, Tetra Tech START Quality Assurance Manager

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Date

Kevin Larson , Region 7 Superfund Division, EPA On-Scene Coordinator

Date

Bob Dona, Region 7 Superfund Division, Quality Assurance Coordinator

Date

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- B Standard Operating Guideline for Volatile Organic Compounds in Soil, Sediment and Water by Solid Phase Microextraction and Gas Chromatography
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- A EPA Standard Operating Procedure 4231.707A Portable XRF Analyzer, and EPA Method 6200, Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment
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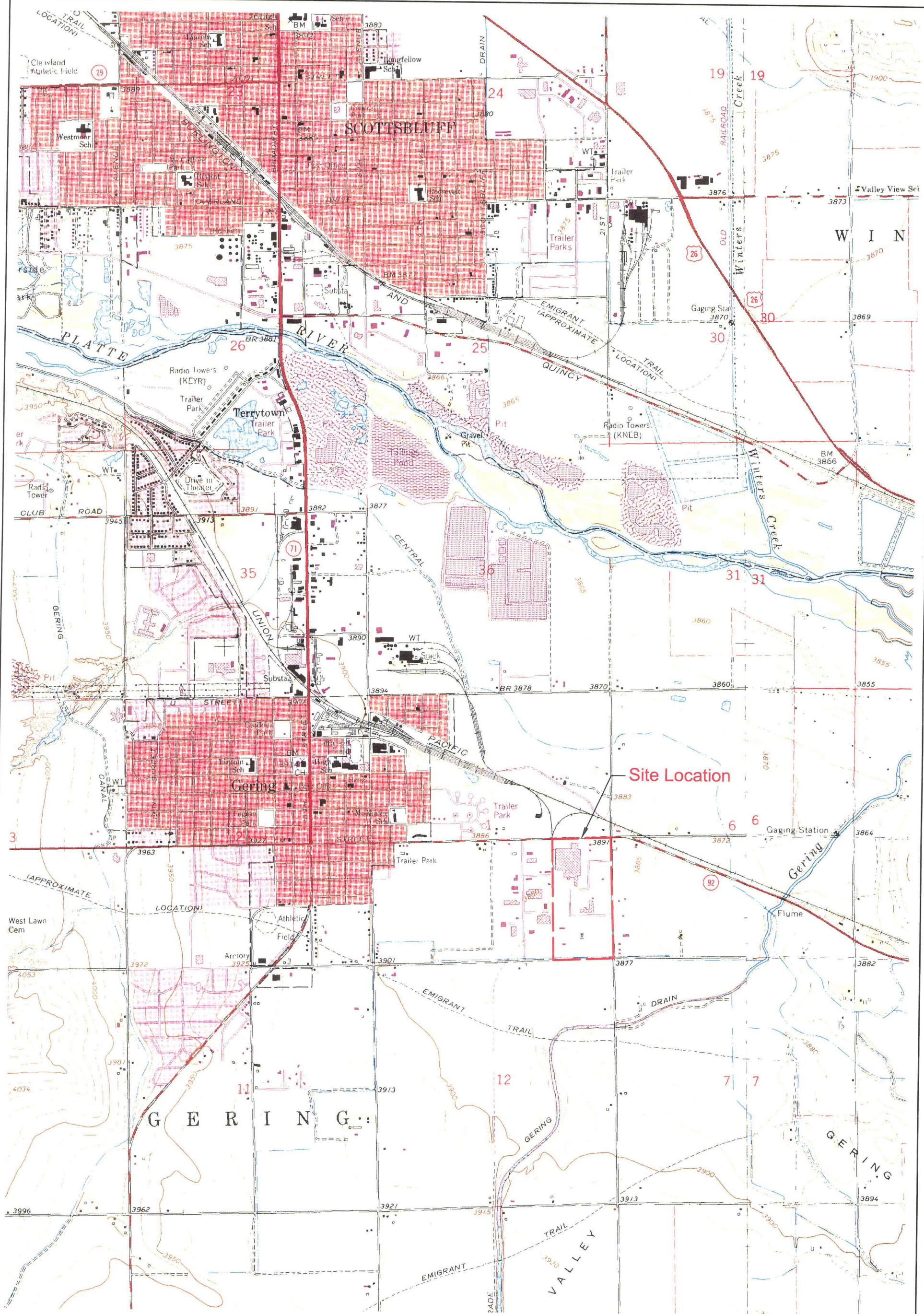
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1.0 INTRODUCTION

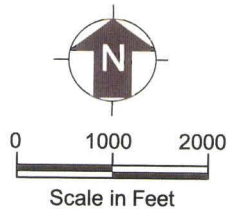
Tetra Tech EM Inc. (Tetra Tech) was tasked by the U.S. Environmental Protection Agency Region 7 (EPA) to assist the EPA On-Scene Coordinator (OSC) in the preparation of an integrated site investigation/removal site evaluation (ISI/RE) at Agromac-Lockwood Operating Unit Number 2 site, under Task Order 0008.10, Contract Number 68-S7-01-41. This site-specific Quality Assurance Project Plan (QAPP) has been prepared for use in the sampling and analysis activities in the ISI/RE. Site reconnaissance was conducted on November 8 and 9, 2001, by the Tetra Tech Superfund Technical Assessment and Response Team (START). A review of the EPA file for this site was also conducted. The finding of this file review and site reconnaissance which contains a detailed history of the site, previous sampling activities, and a summary of suspected source areas, was previously submitted to EPA on December 27, 2001. It has been included as Appendix A to this QAPP.


The Agromac-Lockwood Manufacturing site is 0.5 mile east of Gering, Nebraska (see Figure 1, Site Location Map). The geographic coordinates of the site are latitude 41° 82' 11" north and longitude 103° 63' 69" west. The site is located on the Scottsbluff South, Nebraska 7.5 Minute Quadrangle in the southeast quarter of Section 1, Township 21 North, Range 55 West (U.S. Geological Survey [USGS], 1963, revised 1976). The street address of the site is 220759 Highway 92.

The site is on 80 acres in an industrial park. It is bounded to the west by a rail spur and additional industrial facilities, to the north by Nebraska Highway 92, and to the east and south by several private residences. The property has been used by several different corporations to manufacture farm machinery and irrigation equipment. Currently, there are no manufacturing operations being conducted at the site. The main warehouse in the northern part of the site is being leased by the Western Sugar Company (WSC) for storage of raw sugar and packaging materials. The entire 80-acre site is owned by Agromac International, Inc. (AII), except for 3 acres owned by City of Gering and used as an electrical substation, and a closed 1-acre surface impoundment still owned by Lockwood Industries, Inc. (LII). Site features including suspected source areas is shown on Figure 2. The results of previous sampling, a history of site operations and regulatory actions, a summary of suspected source areas, and the finding of the site reconnaissance were previously summarized in the Trip Reports for Site Reconnaissance and File Review Activities for the Agromac-Lockwood site, provided as Appendix A.



SOURCE: USGS Scottsbluff South, NE 7.5 Minute Topo Quad 1963 PR 1976
USGS Minatare, NE 7.5 Minute Topo Quad 1965



Agromac-Lockwood Facility Gering, Nebraska	
FIGURE 1 Site Location Map	
	Tetra Tech EM Inc.
<small>Date: 12/10/01</small>	<small>Drawn By: Collin Willis</small>
<small>Project No: G9011.L01.0008.10</small>	

collected in these background borings from four depth intervals which correspond with the proposed on-site soil sampling intervals. The location of these background borings will be determined in the field. All Geoprobe® samples will be collected in accordance with Region 7 EPA/ENSV Environmental Services SOP 4230.7A, Geoprobe® Operations. Tetra Tech START will collect continuous-core samples using the Geoprobe® Macro-Core soil sampler. All soil samples will be screened for VOCs using a hand-held PID.

If VOCs are detected using a hand-held PID, then soil samples will be collected for off-site VOC analysis by EPA Method 5035. The soil samples submitted for off-site analysis will be analyzed using EPA Method 8260. For each collected sample, two 40 milliliters (mL) volatile organic analytes (VOA) vials preserved with sodium bisulfate will be filled with about 5 grams of soil, and one 4-ounce jar will be filled for VOC analysis in the on-site laboratory. The lids on the VOA vials will be crimped on immediately after sample collection to minimize VOC losses. Four additional preserved VOA vials and one 4-ounce jar will be collected and archived for possible VOC analysis by the off-site laboratory. The 4-ounce jars will be submitted to both laboratories in case an additional sample is needed for VOC reanalysis. The off-site laboratory will also be able to use the contents to analyze for soil moisture after the necessary VOC analysis is complete.

Soil samples for metals analysis by XRF will be collected from within designated intervals where staining or odors are observed. Soil samples for XRF analysis will be collected with a clean, dedicated stainless steel spoon and homogenized in a clean, dedicated aluminum pie pan. Soil will be run through a decontaminated stainless steel 60-mesh screen to eliminate large particles from the matrix. One 4-ounce glass jar will be filled with soil for metals analyses by XRF in the on-site laboratory. This 4-ounce jar will be sent to off-site laboratory for metals analysis if necessary after analysis in the on-site laboratory is completed. All soil samples will be archived for possible analysis in an off-site laboratory for metals (EPA Method 6010B).

Samples for off-site analysis will be selected based on the following criteria. If a sample analyzed by the on-site laboratory documents a hazardous substance is present in a source, or was collected from a location that demonstrates contamination at a target (i.e. a surficial soil sample from a workplace), or an observed release, then the archived sample will be submitted to the off-site laboratory. Selected background soil samples will be submitted to the off-site laboratory for analysis. In source areas where VOC or metals contamination is identified in the MLP, several additional soil samples representing the

medium- and low-concentration ranges of VOCs and metals detected in the on-site laboratory will be submitted to the off-site laboratory to serve as a QA/QC check for the on-site laboratory data.

All sample containers will be labeled and documented in accordance with EPA laboratory procedures (SOPs 2420.2B, 2420.5C, and 2420.13B) and then stored in a sample cooler at 4 °C and secured as specified in SOP 2420.2C. Chains of custody will be maintained for all samples. Samples submitted to the on-site laboratory will be analyzed as soon as practicable.

Several of the source areas are large and will be sampled in a grid pattern laid out in 50- by 50-foot square grids. Sampling teams will select one point within each grid for sampling based on observations of staining, proximity to likely release points such as storage areas for empty drums, debris, or in the absence of these features, near the center of the grid. The following source areas will be sampled using this sampling strategy: Waste Oil and Empty Drum Storage Area, Raw Product Storage Area, Hazardous Waste Storage Area D, and Scrap Metal Storage Bin Area. Other source areas will be sampled at the locations shown on Figure 3.

2.1.3 Geoprobe® Groundwater Sampling

Tetra Tech START will collect groundwater samples using a Screenpoint 15® groundwater sampler advanced with a Geoprobe®. Groundwater samples will be collected from at least four locations downgradient of the closed surface impoundments as shown on Figure 4. Four locations upgradient of the site will be sampled to establish background concentrations as shown in Figure 5. Additional samples will also be collected below the sumps inside the galvanizing building, at least one location downgradient of the galvanizing building, and at least one location downgradient of the spent acid pit. The collection of groundwater from below the sumps in the galvanizing building will require the use of a concrete coring device to penetrate the bottom of the sump. When sampling in these sumps is completed the bore hole will be filled with bentonite slurry and concrete patch will be used to seal the sump. If soil gas sampling indicates that significant concentrations of VOCs are present, additional groundwater samples will be collected at these source areas. The estimated number of samples to be collected is summarized in Table 3.

Groundwater samples for MLP VOC analysis will be collected in the following manner. For the on-site laboratory, two VOA vials will be filled with 10 mL of water measured out using a 10-mL plastic

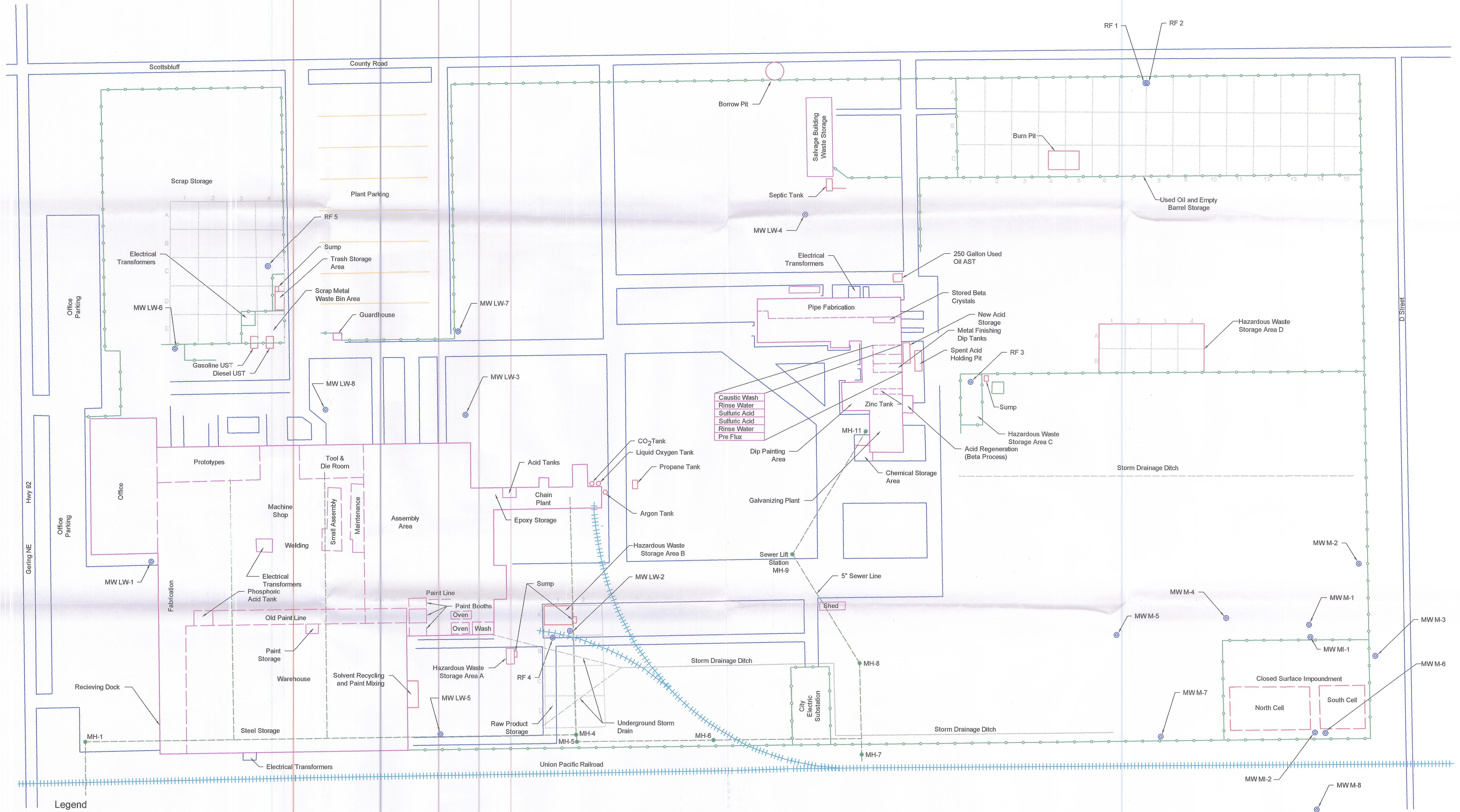
1.1 PROJECT AND TASK DESCRIPTION

The primary objectives of this ISI/RE are twofold. The first objective is to identify the nature and extent of contaminated soil and groundwater exhibiting concentrations that may cause imminent and substantial endangerment to human health and environment. The analytical results from soil, sludge, wastewater, and groundwater samples collected as part of this ISI/RE will be used to determine if additional removal actions are required. The second objective is to gather data to support a site score using the Hazard Ranking System (HRS) model. The data gathered should adequately document the groundwater and soil exposure pathways. A draft site score using the HRS will be prepared as part of the ISI/RE Report. The field effort will include collection of environmental samples and acquisition of non-sampling data. Abandoned chemicals will be inventoried and tested if necessary to facilitate their removal and disposal. Metal treatment sludges and abandoned beta acid crystals, a byproduct of a sulfuric acid regeneration process formerly used on-site, will also be sampled for removal and disposal purposes. Environmental samples will be analyzed for volatile organic compounds (VOCs) and metals in an on-site laboratory to ensure that the source areas and extent of potential contamination have been adequately defined during the field effort. Targeted samples will be sent for formal laboratory analysis to provide defensible data.

An assessment of the data acquired during this project will be performed according to procedures outlined in EPA guidance documents for conducting Site Investigation (SI) and in the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR 300.415(b)(2), for determining the need for a removal action. This QAPP identifies site-specific features, addresses elements of the sampling strategy, and analytical methods proposed for this site investigation.

1.2 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

The project's data quality objective is to provide valid data of known and documented quality to determine the nature and extent of contaminated soil and groundwater on and near the site property. The abandoned chemicals and industrial wastes located on the property will be inventoried and sampled to facilitate disposal of these materials. Sumps and septic tanks on site will be sampled to determine if hazardous substances are present and whether removal of sludge and wastewater contained in these structures will require removal. Based on the file review, it appears that two primary contaminants of concern are present at the site: metals and VOCs.



1.2.1 Accuracy and Precision

For this project, data quality objectives for accuracy and precision will apply only to analytical quality assurance (QA) samples and field duplicates. These samples will be discussed in Section 2.5. The data quality objectives for the on-site laboratory are stated in the Standard Operating Guidelines (SOG) provided as Appendices A and B and in the EPA Methods provided as Attachment A.

1.2.2 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent characteristics of a population, parameter variations at a sampling point, or an environmental condition that they are intended to represent. Representativeness is a qualitative parameter; therefore, no specific criteria must be met. For this project, representative data will be obtained through careful selection of sampling locations and analytical parameters, proper collection and handling of samples to avoid interferences and minimize cross-contamination and loss of analytes, and use of standardized field and laboratory procedures and their consistent application. To aid in evaluation of sample representativeness, laboratory blank samples will be evaluated for the presence of contaminants. Method blank samples will be considered in evaluating the validity of data when problems exist with contamination in any of the analytical instruments (such as carryover).

1.2.3 Completeness

Completeness is defined as the percentage of measurements that are judged to be valid. The project completeness value will be determined at the conclusion of the data validation phase and will be calculated by dividing the number of complete, valid sample results by the total number of sample analyses planned for the project. The data validation process will determine whether a particular data point is (1) a valid result that is acceptable for all uses, (2) an estimated result that is acceptable for limited uses, or (3) a rejected result that is unacceptable for any use.

Complete results are defined as results that are considered to be valid and include estimated results. Sample results that are considered rejected, unacceptable, and unusable when compared to quality control (QC) criteria are listed as incomplete. A completeness goal of 95 percent is expected for data generated by the contract laboratory.

1.2.4 Comparability

Comparability is a qualitative and quantitative parameter that expresses the confidence with which one data set may be compared to another. This goal is achieved through the use of (1) standardized techniques to collect samples, (2) standardized analytical methods, and (3) appropriate units to report analytical results. The comparability goals for the on-site laboratory are stated in the Standard Operating Guidelines (SOG) provided as Appendices A and B, and in the EPA Methods provided as Attachment A.

1.3 SPECIAL TRAINING REQUIREMENTS AND CERTIFICATION

The only required formal training of site personnel will be the completion of the Occupational Safety and Health Administration basic 40-hour health and safety training course, Hazardous Waste Operations and Emergency Response, including annual refreshers. Familiarization with operation of portable instrumentation for screening of samples and personal protection will be required for the Tetra Tech START sampling team. The following instrumentation will be used: a photoionization detector/ flame ionization detector (PID/FID) will be used to screen samples for VOCs; a water quality meter will be used to measure temperature, pH, and conductivity on groundwater during well purging. Sampling personnel will be experienced in Geoprobe® operation, collection of soil, sediment, and groundwater samples, and operation of a backpack mounted Global Positioning System (GPS) receiver. Field chemists will be experienced in the preparation and analysis of soil samples for metals and VOCs and , soil gas, and groundwater samples for VOCs.

1.4 DOCUMENTATION AND RECORDS

Tetra Tech START personnel will maintain a field logbook to record all pertinent activities associated with the sampling event. There will be proper identification, documentation and tracking of samples. Information pertaining to all samples (such as sample dates, times, matrix, and location) collected during this project will be recorded.

All off-site laboratory analytical information will be handled in accordance with the laboratory's approved QA manual.

2.0 MEASUREMENT AND DATA ACQUISITION

2.1 SAMPLING PROCESS DESIGN AND METHODS REQUIREMENTS

The sampling approach will be divided into eight tasks:

- Mobile laboratory program (MLP)
- Geoprobe® soil sampling
- Geoprobe® groundwater sampling
- Private and monitoring well sampling
- Sludge and wastewater sampling
- Geoprobe® soil gas sampling
- Global positioning system (GPS) surveying
- Investigation-derived waste sampling

Each of these tasks is discussed in detail in subsections 2.1.1 through 2.1.9. Sampling is scheduled to begin on January 14, 2002, and is expected to take about 10 days to complete. Additional time may be required in the event of inclement weather. Table 1 contains a summary of the site assessment sampling objectives. Separate tables listing the samples to be collected in each matrix are included in the appropriate sections that follow.

During all the sampling activities listed below, dedicated equipment such as disposable bailers will be employed to prevent contamination of samples. Where using dedicated samplers is not feasible or cost effective, sampling equipment will be decontaminated in accordance with EPA Standard Operating Procedure (SOP) 4231.6 A.

TABLE 1
SITE ASSESSMENT SAMPLING OBJECTIVES AGROMAC-LOCKWOOD OPERATING
UNIT NUMBER 2, GERING, NEBRASKA

Element	Objectives	Proposed Field Activities
Sources	Determine the extent of the contaminated source areas to assess whether a removal is required, and if so, to guide removal activities.	Collect surface and subsurface soil samples from the suspected source areas. Sludges and wastewater samples will be collected from on-site septic tanks, storm water basins, and from pits in the metal treatment area. Abandoned chemicals including beta acid crystals will also be sampled. Soil gas samples will be collected to find sources of VOC contamination in soil.
Groundwater Pathway	Determine the extent of contamination through the groundwater pathway	Sample all 22 existing monitoring wells on-site. Collect additional groundwater samples at source areas including the closed surface impoundments, along sewer lines, the metal treatment sumps and waste acid storage pit in the galvanizing area, the solvent recycling facility, and selected background areas using a Geoprobe®. Gering Municipal Well No. 6 and nearby private residences including several residences upgradient (southwest of the site) and downgradient (northeast of the site) will be sampled to determine if any drinking water wells have been impacted by the site by releases from the site. Groundwater sampling will determine whether an observed release to the groundwater migration pathway has occurred.
Surface Water Pathway	Not evaluated	Not evaluated
Soil Exposure Pathway	Determine whether further CERCLA remedial action is warranted	Conduct soil sampling in suspected source areas including four hazardous waste storage areas near the galvanizing building and one near the manufacturing building, the former waste oil and empty drum storage area, around the raw product storage areas, scrap metal bin area, the solvent recycling area, and along storm water drainage ways.
Air Pathway	Not evaluated	Not evaluated

Note: CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

VOC = Volatile Organic Compounds

2.1.1 Mobile Laboratory Program

The Mobile Laboratory Program (MLP) or on-site laboratory will be used to provide analytical results in the shortest possible time to allow the program managers and field teams to make timely decisions about subsequent sampling. The analytical procedures and methods to be used are described in a standard operating guideline (SOG) prepared for VOC analysis using the MLP. This SOG has been included as Appendix B. Soil gas samples will be analyzed in the MLP using the SOG for VOCs in Soil Gas by Direct Injection and Gas Chromatography, included as Appendix C. Soil samples will be analyzed in the on-site laboratory using X-ray fluorescence spectroscopy (XRF). Metals analysis using the XRF will follow EPA Region 7 SOP No. 4231.707A and EPA Method 6200. Copies of these EPA SOPs and Methods are included as Attachment A.

This section describes briefly how the results from the on-site laboratory will be used to guide the sampling during the ISI/RE.

One objective of the ISI/RE is to define the extent of the suspected source areas on site. The boundaries of the source areas will be delineated to document waste quantity for HRS scoring and to delineate areas that may require removal or remediation. Previous investigations have shown that chlorinated VOCs are present in and around the waste oil storage area, the closed surface impoundment, and from an unidentified source near the center of the site. Elevated levels of metals have previously been detected in several areas including the scrap metal waste bin area, the raw product storage area, and the hazardous waste storage area south of the galvanizing building. The analytical data from the on-site laboratory will allow samplers to determine whether the extent of VOCs in soil and groundwater and metals in soil have been adequately defined. Sampling efforts will be expanded as necessary to ensure that the extent of VOC contamination has been defined in both soil and groundwater before the field sampling teams leave the site. In the following sections, an estimate of the number of samples needed to define the VOC and metals contamination has been provided. Additional samples may be required to delineate the extent of VOC and metals contamination. If the sampling effort must expand significantly, the EPA OSC will be consulted, and if necessary, the scope of work will be revised with EPA approval.

To determine if the extent of metals and VOC contamination in soils has been adequately defined the results generated in the mobile laboratory will be compared to the EPA Region 9 Preliminary Remedial Guidelines (PRG) for industrial soil (EPA, 2000) (Attachment B). If a concentration in a surficial soil

sample (0 to 2 feet below ground surface [bgs]) exceeds the PRG, then four additional step-out samples will be collected within the 50-foot grid to determine the extent of contamination that could potentially require removal. The results in soil samples collected from greater depths will also be compared to PRGs to determine whether step-out samples are required. The EPA OSC will be consulted concerning the results of the deeper soil sampling prior to initiating step-out sampling. A PRG for lead in soil has not been proposed by Region 9. A value of 1,000 milligrams per kilogram (mg/kg) of lead in soil will be used to determine whether a step-out sample is required. This 1,000 mg/kg concentration is based on the lower end concentration designed to be protective for full time on-site worker calculated using recommendations by an EPA Technical Review Workgroup (EPA 1996).

The MLP will also be used to determine if the extent of VOC contamination in groundwater has been adequately defined. VOC sampling in groundwater will be conducted until the outer edge of any VOC plumes are defined. The lower detection limits of the MLP will be used as the benchmark for determining whether the VOC plume has been defined. The detection limits for VOCs in groundwater are stated in the SOG provided as Appendix B.

The second objective of the on-site laboratory will be to select samples for off-site laboratory confirmation analysis. Samples will be selected for confirmation analysis from throughout the ranges of concentrations reported by the MLP including non-detects. This will provide confirmation sampling results for comparability evaluations from all ranges of concentrations. Samples that document the presence of hazardous substances in a source area will be sent to the off-site laboratory for confirmation analysis, and to provide defensible data for use in subsequent CERCLA actions if necessary. Samples which document actual contamination at a target, such as in a drinking water well or work place, will also be submitted to the off-site laboratory for the same reasons. Finally, additional analyses may be performed in the off-site laboratory as described in the following sections.

2.1.2 Geoprobe® Soil Sampling

Tetra Tech START has devised a soil sampling strategy that will identify the nature and extent of contaminated soil on and near the site. To achieve ISI objectives, Tetra Tech START will conduct soil sampling in and around the suspected source area listed in Table 2, which also specifies the sampling intervals and analyses required. Proposed soil sampling locations are shown in Figure 3. Background soil samples will be collected from four Geoprobe® borings located off-site. Soil samples will be

TABLE 2
PROPOSED SOURCE DELINEATION SOIL SAMPLING SUMMARY
AGROMAC-LOCKWOOD OPERATING UNIT NUMBER 2, GERING, NEBRASKA

Location	Sample Intervals in Feet	Estimated Number of Samples	On-site Laboratory		Off-site Laboratory	
			Metals (XRF)	VOCs	Metals (6010 B)	VOCs (8260)
Oil Storage and Empty Drum Storage Area	0 to 2, 2 to 4	84	84	TBD	9	TBD
Raw Product Storage Area	0 to 2, 2 to 4	16	16	TBD	2	TBD
Scrap Area	0 to 2, 2 to 4	40	40	TBD	4	TBD
Hazardous Waste Storage Area A	0 to 2, 2 to 4	8	8	TBD	1	TBD
Hazardous Waste Storage Area B	0 to 2, 2 to 4	8	8	TBD	1	TBD
Hazardous Waste Storage Area C	0 to 2, 2 to 4	16	16	TBD	2	TBD
Hazardous Waste Storage Area D	0 to 2, 2 to 4	16	16	TBD	2	TBD
Solvent Recycling Area	0 to 2, 2 to 6, 6 to 10, 10 to 14	16	16	TBD	2	TBD
Burn Pit	0 to 2, 2 to 6, 6 to 10	12	12	TBD	1	TBD
Scrap Metal Area Pad	0 to 2, 2 to 6, 6 to 10	24	24	TBD	3	TBD
Spent Acid Pit Area	0 to 2, 2 to 6, 6 to 10, 10 to 14	32	32	TBD	3	TBD
Surface Impoundments	0 to 2, 2 to 6, 6 to 10, 10 to 14	24	24	TBD	3	TBD
Galvanizing Building Sumps	0 to 2, 2 to 6, 6 to 10, 10 to 14	32	32	TBD	3	TBD
Borrow Area	0 to 2, 2 to 6, 6 to 10	9	9	TBD	1	TBD
Storm Water Ditches	0 to 2, 2 to 4	16	16	TBD	2	TBD
Field Duplicates	0 to 2, 2 to 6, 6 to 10, 10 to 14	36	36	TBD	4	TBD

TABLE 2 (Continued)
PROPOSED SOURCE DELINEATION SOIL SAMPLING SUMMARY
AGROMAC-LOCKWOOD OPERATING UNIT NUMBER 2, GERING, NEBRASKA

Location	Sample Intervals in Feet	Estimated Number of Samples	Metals (XRF)	On-site Laboratory	Off-site Laboratory	
				VOCs	Metals (6010 B)	VOCs (8260)
Rinsate Blanks	NA	10	NA	10	10	TBD
MS/MSD	NA	18	18	2	2	TBD
Totals		417	407	TBD	55	TBD

Notes: All sample numbers are estimates. If significant contamination is encountered, the actual number of samples will increase.

Numbers in parentheses indicate the EPA analytical method

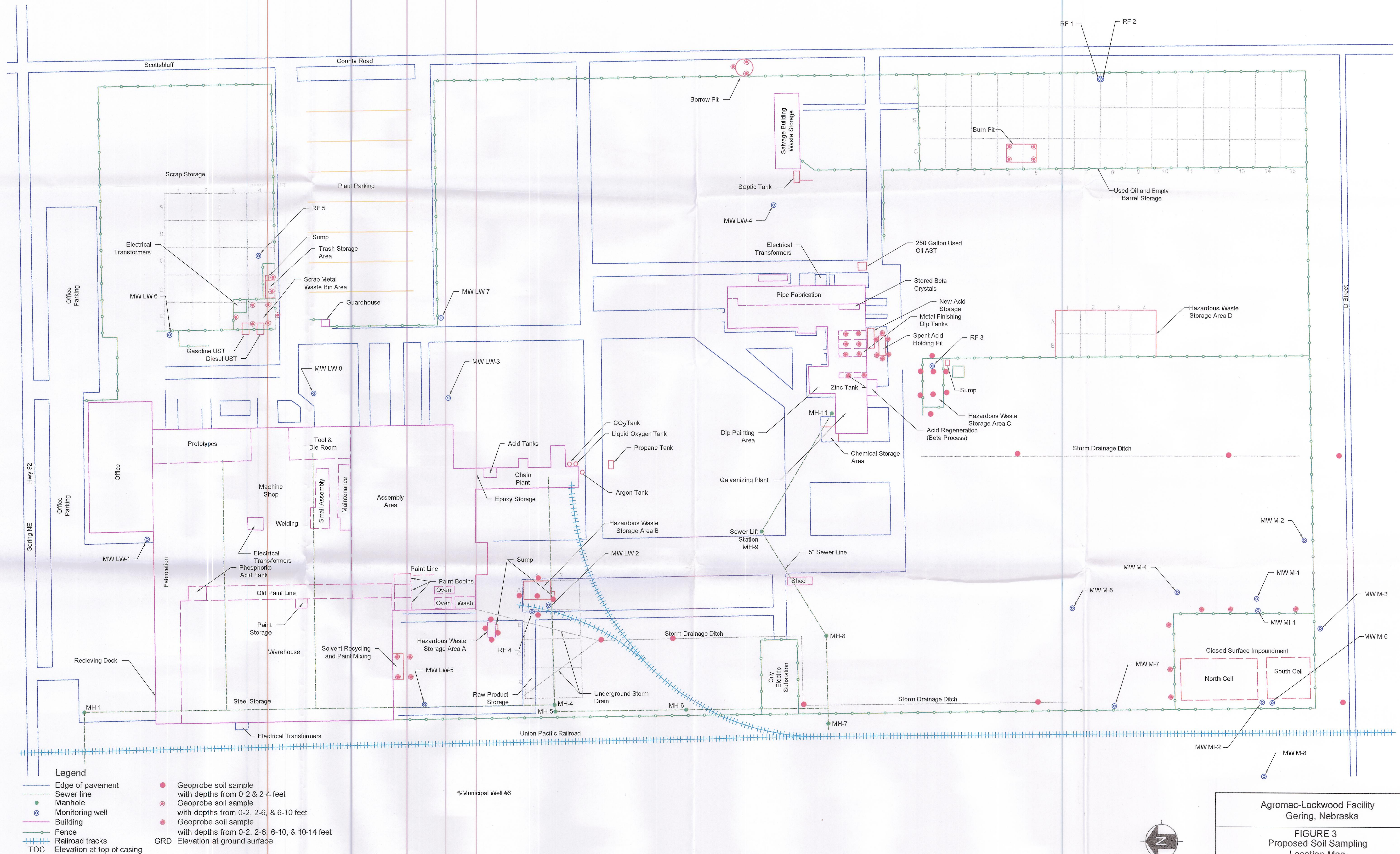
NA = Not applicable

VOCs = Volatile Organic Compound

XRF = X-Ray Fluorescence Spectrometry

MS/MSD = Matrix spike/matrix spike duplicate

TBD = To be determined



Agromac-Lockwood Facility
Gering, Nebraska

FIGURE 3
Proposed Soil Sampling
Location Map

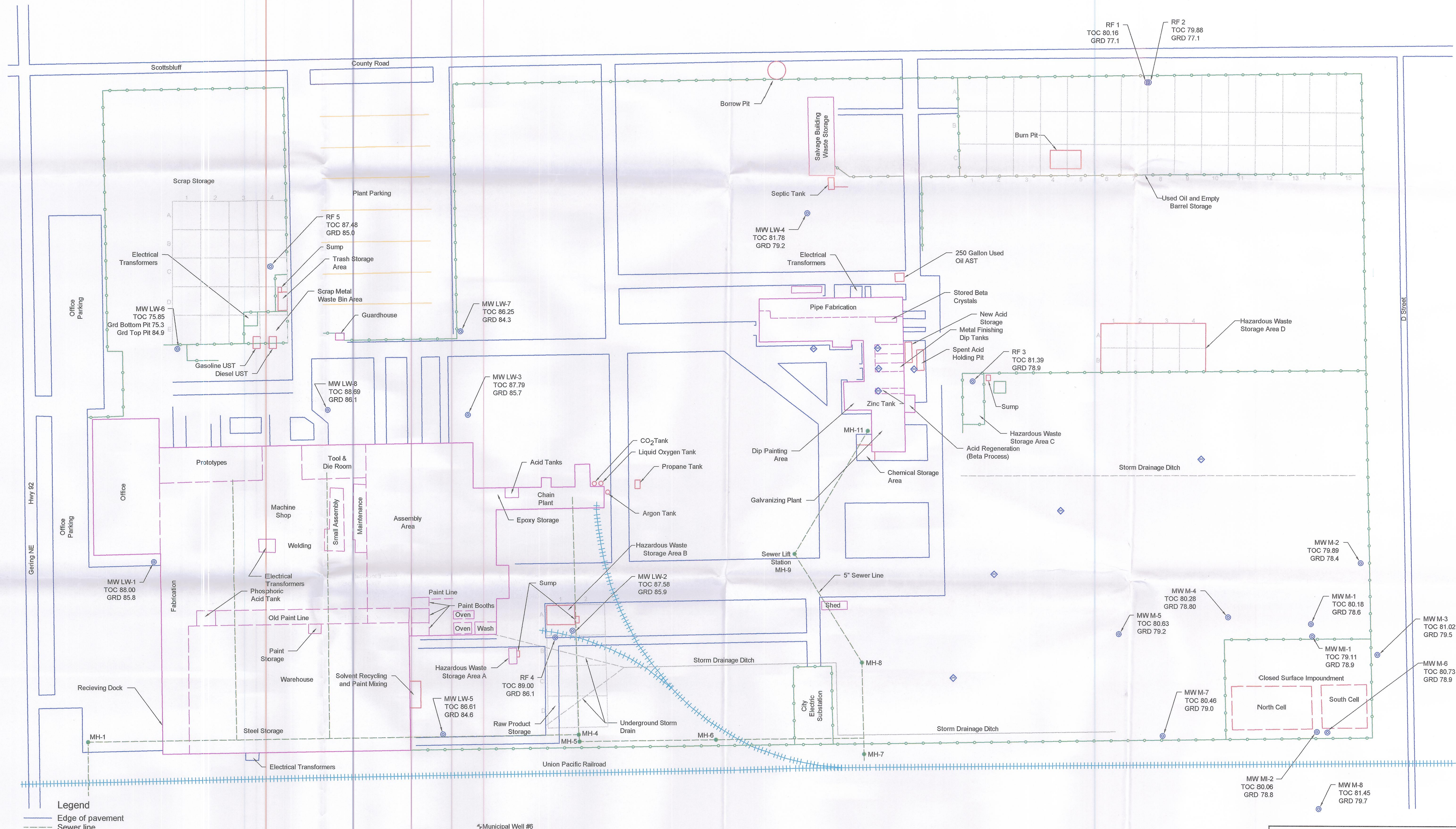


Tetra Tech EM Inc.

Date: 12/10/01

Drawn By: Colin Willis

Project No: G8011.L01.0008.10

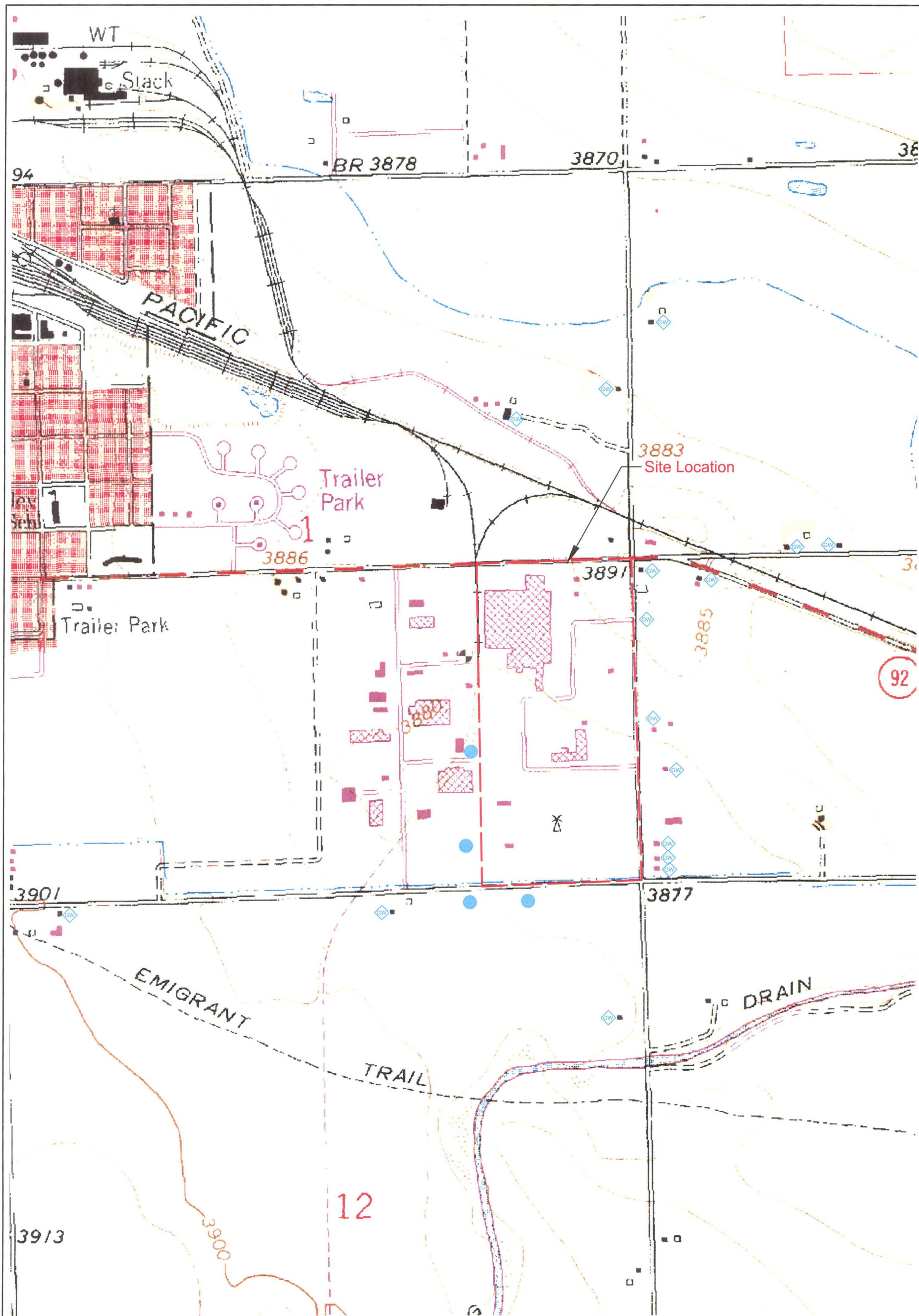


Agromac-Lockwood Facility
Gering, Nebraska

FIGURE 4
Proposed On-Site Groundwater
Sampling Location Map

Tt Tetra Tech EM Inc.

Date: 12/10/01 Drawn By: Colin Wilts Project No: G9011.L.01.0006.10



Legend

- ◆ Residential well sample location
- Background geoprobe groundwater sample location
- ▲ Municipal well #6

SOURCE: USGS Scottsbluff South, NE 7.5 Minute Topo Quad 1963 PR 1976
USGS Minatare, NE 7.5 Minute Topo Quad 1965



0 375 750
Scale in Feet

Agromac-Lockwood Facility
Gering, Nebraska

FIGURE 5
Proposed Off-Site Groundwater
Sampling Location Map



Tetra Tech EM Inc.

Date: 12/10/01

Drawn By: Colin Willis

Project No: G9011.L01.0008.10

TABLE 3
PROPOSED GEOPROBE® GROUNDWATER SAMPLING SUMMARY
AGROMAC-LOCKWOOD OPERATING UNIT NUMBER 2, GERING, NEBRASKA

Location	Estimated Number of Samples	On-site Laboratory	Off-site Laboratory		
		VOCs	VOCs (8260)	Total Metals (6010 B)	Filtered Metals (6020)
Closed Surface Impoundments	4	4	4	4	4
Galvanizing Building	5	5	5	5	5
Background	4	4	4	4	4
Field Duplicates	2	2	2	2	2
Rinsate Blanks	2	2	2	2	2
MS/MSD	1	1	1	1	1
Totals	18	18	18	18	18

Notes: All sample numbers are estimates, if significant contamination is encountered the actual number of samples will increase.
Numbers in parentheses indicates the EPA analytical method
MS/MSD = Matrix spike/matrix spike duplicate

syringe. The partially-filled VOA vials will be capped and the tops will be crimped in place by the sample collection team, sealing the vials to prevent loss of VOCs. The VOA vials for on-site analysis will be preserved with 0.5 mL of phosphoric acid and 4.0 grams of sodium sulfate. The vials will be agitated until complete dissolution of the sodium sulfate has occurred.

These VOA vials will be analyzed in the on-site laboratory using a heated headspace analysis. The on-site laboratory will perform a solid phase microextraction of the gases released into the head space of the VOA vial. These procedures are described in a separate SOG prepared for the MLP which has been provided as Appendix B. One additional full unpreserved VOA vial will be collected for the on-site laboratory as a back-up sample in case re-analysis is required.

Four 40-mL VOA vials, preserved with hydrochloric acid to a pH of 2 and iced to a temperature of 4 °C will be collected for analysis at the off-site laboratory. Samples for analysis of total metals will be collected in a 1-liter cubitainer, preserved with nitric acid to a pH of 2, and iced to a temperature of 4 °C. All groundwater samples to be analyzed for dissolved metals will first be filtered through a 0.45 micron filter, transferred into a 1-liter cubitainer, then preserved with nitric acid to a pH of 2, and iced to a temperature of 4 °C. Samples collected for total metals will be analyzed using EPA Method 6010 B, and samples collected for dissolved metals will be analyzed using EPA Method 6020. Samples for VOC analysis in Geoprobe sampling locations, on-site monitoring wells and off-site lawn and garden wells will be analyzed by EPA Method 8260 in the off-site laboratory. Those groundwater samples collected from a drinking water well will be analyzed in the off-site laboratory using EPA Method 524 for VOCs in Drinking Water. Sufficient sample volume will be collected and the appropriate sample containers filled at each groundwater sampling location if groundwater recharge permits.

The Geoprobe® groundwater sampling locations and depths will be selected in the field, based in part on the results of the soil gas sampling and VOC results from the sampling of on-site monitoring wells. All Geoprobe® samples will be collected in accordance with Region 7 EPA/ENSV SOP. 4230.7: "Geoprobe® Operation." Purging procedures and measurement of field parameters will be conducted as described in Section 2.1.4. If VOC contamination is detected by the on-site laboratory in samples collected using the Geoprobe®, then additional groundwater samples will be collected to delineate the outer edges of the groundwater plume.

Geoprobe® groundwater samples will be collected using a peristaltic pump with disposable polyethylene tubing. Samples will be collected directly from the discharge tubing maintaining a flow rate of 0.5 gallons per minute (gpm) to minimize turbulence. Tetra Tech START will collect groundwater samples in accordance with Region 7 EPA/ENSV SOP 4230.15A.

2.1.4 Monitoring Well and Private Well Purging and Sampling

Samples will be collected from the 22 existing monitoring wells on site. The location of the existing monitoring wells was previously shown on Figure 4. Groundwater samples will be collected in accordance with EPA SOP 4320.15A "Groundwater Sample Collection." All monitoring well samples and off-site well samples will be analyzed in the mobile laboratory. In addition, all off-site water wells will be sampled for off-site analysis. The proposed off-site sampling locations are shown in Figure 5. Drinking water samples will be collected in accordance with EPA SOP 4230.10A. Sampling procedures are summarized below. Table 4 summarizes the proposed monitoring well sampling, and Table 5 summarizes the proposed private well sampling.

Prior to sampling an electronic water level indicator will be used to measure the depth to groundwater to the nearest 0.1 foot in the on-site monitoring wells. These water levels will be entered into a surface water contouring program such as Surfer® to generate a real-time map of groundwater gradients as an aid to the groundwater sampling effort.

Before a groundwater sample is collected from a monitoring well, a minimum of three volumes of the standing water column will be purged. Groundwater temperature, pH, and conductivity will be measured with a HORIBA U-10 after purging each volume of the standard water column to ensure that groundwater samples are representative of current site conditions. After stabilization of the water levels in each well, an electronic water level indicator will be used to measure the depth to groundwater to the nearest 0.1 foot.

TABLE 4
PROPOSED MONITORING WELL SAMPLING SUMMARY
AGROMAC-LOCKWOOD OPERATING UNIT NUMBER 2, GERING, NEBRASKA

Location	Estimated Number of Samples	On-site Laboratory	Off-site Laboratory		
		VOCs	VOCs (8260)	Total Metals (6010B)	Filtered Metals (6020)
On-site Wells	22	22	22	22	22
Field Duplicates	3	3	3	3	3
Rinsate Blanks ¹	NA	NA	NA	NA	NA
MS/MSD	1	1	1	1	1
Totals	26	26	26	26	26

Notes: Numbers in parentheses indicates the EPA analytical method
MS/MSD = Matrix spike/matrix spike duplicate
VOCs = Volatile Organic Compounds
NA = Not applicable
¹ = Dedicated disposable bailers will be used for sample collection: equipment rinsates are not required

TABLE 5
PROPOSED OFF-SITE WELL SAMPLING SUMMARY
AGROMAC-LOCKWOOD OPERATING UNIT NUMBER 2, GERING, NEBRASKA

Location	Estimated Number of Samples	On-site Laboratory	Off-site Laboratory		
		VOCs	Drinking Water VOCs (524)	Total Metals (6010B)	Filtered Metals (6020)
Private Wells	17	17	17	17	17
Municipal Well	1	1	1	1	1
Field Duplicates	2	2	2	2	2
Rinsate Blanks ¹	NA	NA	NA	NA	NA
MS/MSD	1	1	1	1	1
Totals	21	21	21	21	21

Notes: Numbers in parentheses indicates the EPA analytical method

VOC = Volatile Organic Compounds

MS/MSD = Matrix spike/matrix spike duplicate

NA = Not applicable

¹ = Dedicated disposable bailers will be used for sample collection; equipment rinsates are not required

A submersible pump or disposable bailer will be used to obtain groundwater samples from the 22 on-site monitoring wells. If a submersible pump is used to sample a well, the pump intake will be positioned near the center of the screened interval. Samples will be collected directly from the discharge hose. Pumping rates during sampling will be maintained below 0.5 gpm in order to minimize turbulence of the sample. If a pump is not used, groundwater will be collected using dedicated bailers and will be poured directly from the bailer to the appropriate sample containers.

A groundwater sample will be collected from nearby private wells that can be located and accessed. At least three private wells upgradient of the site will be sampled. Previous sampling efforts indicated that at least six private wells are located along the eastern edge of the facility. Additional wells northeast of the site will also be sampled to determine if a plume of metals or VOCs have moved off-site. All private wells will be sampled for total metals (EPA Method 6010B), dissolved metals (EPA Method 6020), and VOCs. The analytical method for VOCs in drinking water wells will be EPA Method 524. All drinking water samples will require the collection of four preserved 40 mL VOA vials. Lawn and garden wells will be sampled for VOCs using EPA Method 8260. All private well samples will also be analyzed for VOCs in the on-site laboratory. This will ensure that the extent of VOCs in groundwater, as detected in private wells, has been fully delineated prior to demobilizing from the site.

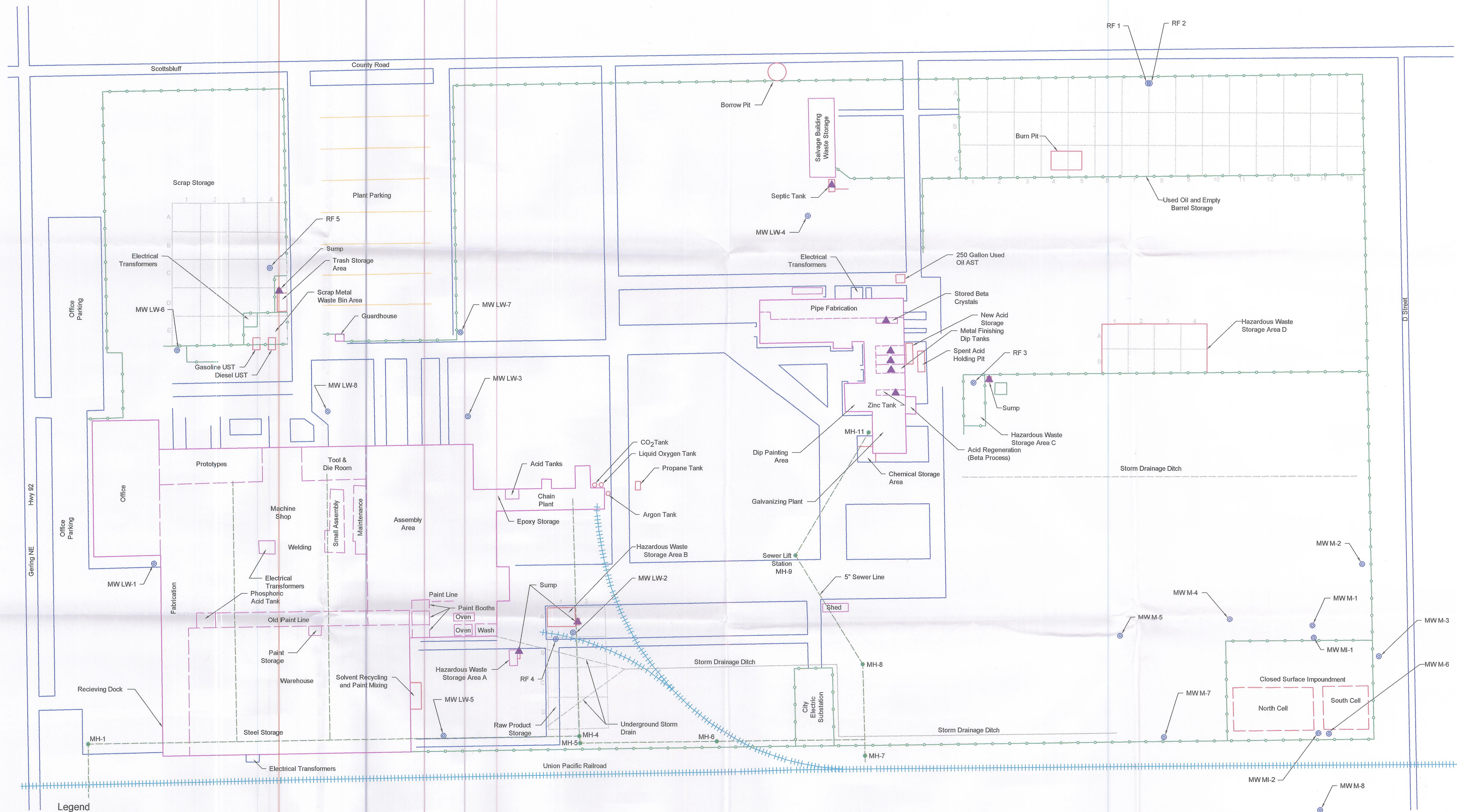
The sample containers, preservatives, and purging techniques will be the same as those used in monitoring well sampling. The sample containers to be used are the same as those specified in Section 2.1.3 for Geoprobe® groundwater sampling with one exception. Off-site wells used for drinking water will be sampled using EPA Method 524 for VOCs. This will require the collection of four preserved 40-mL VOA vials. Private wells will be purged for 10 minutes before sampling. Groundwater parameters including temperature, pH and conductivity will be monitored while the private wells are being purged to ensure adequate purging prior to sampling. If three consecutive readings are within 10 percent for all three of the previously listed water quality indicators, the wells will be considered adequately purged. Sampling will be collected from a tap or a hydrant plumbed in a location before the water is treated, if possible.

2.1.5 Sludge and Wastewater Sampling

Proposed sludge and wastewater sampling locations are shown on Figure 6. Sludge and wastewater samples will be collected from the on-site septic tank located by the salvage building, if it can be successfully located and accessed. Sludge and wastewater samples will also be collected from the rainwater collection sumps located at hazardous waste storage areas A, B, and C, and the sump at the scrap metal waste bin area. Sludges will also be collected from the secondary containment sumps that formerly housed the metal treatment vats in the galvanizing building. There are two secondary containment sumps in the galvanizing building, one of which is divided into three subdivided sumps. There are at least four separate sump areas in the galvanizing building that will require sampling. It is not anticipated that wastewater samples will be obtained in these secondary containment sumps, as they were dry at the time of the site reconnaissance. If water has accumulated in these sumps then the water will be sampled as wastewater. Additional samples will be collected from the abandoned beta acid crystals currently stored in the galvanizing building.

Metal treatment sludges in the galvanizing building and the beta acid crystal samples for metals, toxicity characteristic leaching procedure (TCLP) metals, and pH analysis will be collected as five-point composite samples and homogenized in aluminum pie pans using dedicated stainless steel spoons. All other sludge samples will be collected as grab samples. If significant volumes of sludge or drums with unknown contents are encountered in other areas, the EPA OSC will be consulted. If it is deemed necessary additional sludge and drum samples may be collected. The metal treatment sludges and beta acid crystals will also require pH analysis due to the history of acid and caustic use in the galvanizing building.

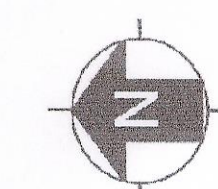
The proposed sludge and wastewater sampling are shown in Tables 6 and 7, respectively. Sludge and wastewater sampling will be conducted in accordance with EPA SOPs 4230.4A and 4231.10A. Access ports or man ways will be uncovered using a backhoe or hand digging. The sumps at the hazardous waste storage area have galvanized metal covers that can be lifted by hand. The access ports will be opened, and air in the openings will be screened for VOCs, combustible gases, and oxygen-deficient environments. If deemed safe, then the sampling team will retrieve sludge and wastewater samples from the septic tank using a Coliwasa or Sludge Judge® sampler.



- Legend**
- Edge of pavement
 - Sewer line
 - Manhole
 - ⊙ Monitoring well
 - ▭ Building
 - Fence
 - Railroad tracks
 - TOC Elevation at top of casing
 - GRD Elevation at ground surface
 - ▲ Sludge & wastewater sample

Note: All elevations are +3800 feet above sea level

▲ Municipal Well #6



1" = Approximately 88'

Agromac-Lockwood Facility
Gering, Nebraska

FIGURE 6
Proposed Sludge & Wastewater
Sampling Location Map



Tetra Tech EM Inc.

Date: 12/16/01

Drawn By: Colin Willis

Project No: G01011 L.01.0008.10

TABLE 6
PROPOSED SLUDGE SAMPLING SUMMARY
AGROMAC-LOCKWOOD OPERATING UNIT NUMBER 2, GERING, NEBRASKA

Location	Estimated Number of Samples	On-site Laboratory	Off-site Laboratory				
		VOCs	Metals (XRF)	VOCs (8260)	Metals (6010 B)	TCLP Metals (1311A)	pH (9040B)
Septic Tank (Salvage Building)	1	1		3	3	3	3
Hazardous Waste Storage Areas A,B, and C	3	3	3	3	3	3	3
Scrap Metal Waste Bin Area	1	1	1	1	1	1	1
Metal Treatment Sumps (Galvanizing Building)	4	4	4	4	4	4	4
Beta Acid Crystals	1	1	1	1	1	1	1
Background ¹	NA	NA	NA	NA	NA	NA	NA
Field Duplicates	1	1	1	1	1	1	1
Rinsate Blanks ²	NA	NA	NA	NA	NA	NA	NA
MS/MSD	1	1	1	1	1	1	1
Totals	12	12	12	12	12	12	12

Notes: Numbers in parentheses indicate the EPA analytical method

XRF = X-Ray Fluorescence Spectrometry

VOC = Volatile Organic Compound

TCLP = Toxicity Characteristic Leaching Procedure

MS/MSD = Matrix spike/matrix spike duplicate

NA = Not applicable

¹ = Background sample not required.

² = Equipment rinsate not required; disposable sampler will be used to collect sludge samples

TABLE 7
PROPOSED WASTEWATER SAMPLING SUMMARY
AGROMAC-LOCKWOOD OPERATING UNIT NUMBER 2, GERING, NEBRASKA

Location	Estimated Number of Samples	On-site Laboratory	Off-site Laboratory			
		VOCs	VOCs (8260)	Total Metals (6010 B)	Filtered Metals (6020)	pH (9040B)
Septic Tanks	1	1	1	1	1	1
Hazardous Waste Storage Areas A, B, and C	3	3	3	3	3	3
Scrap Metal Waste Bin Area	1	1	1	1	1	1
Background ¹	NA	NA	NA	NA	NA	NA
Field Duplicates	1	1	1	1	1	1
Rinsate Blanks ²	NA	NA	NA	NA	NA	NA
MS/MSD	1	1	1	1	1	1
Totals	6	6	6	6	6	6

Notes: Numbers in parentheses indicates the EPA analytical method

VOCs = Volatile Organic Compounds

MS/MSD = Matrix spike/matrix spike duplicate

NA = Not Applicable

¹ = Background sample not required

² = Equipment rinsate not required; disposable sampler will be used to collect sludge samples

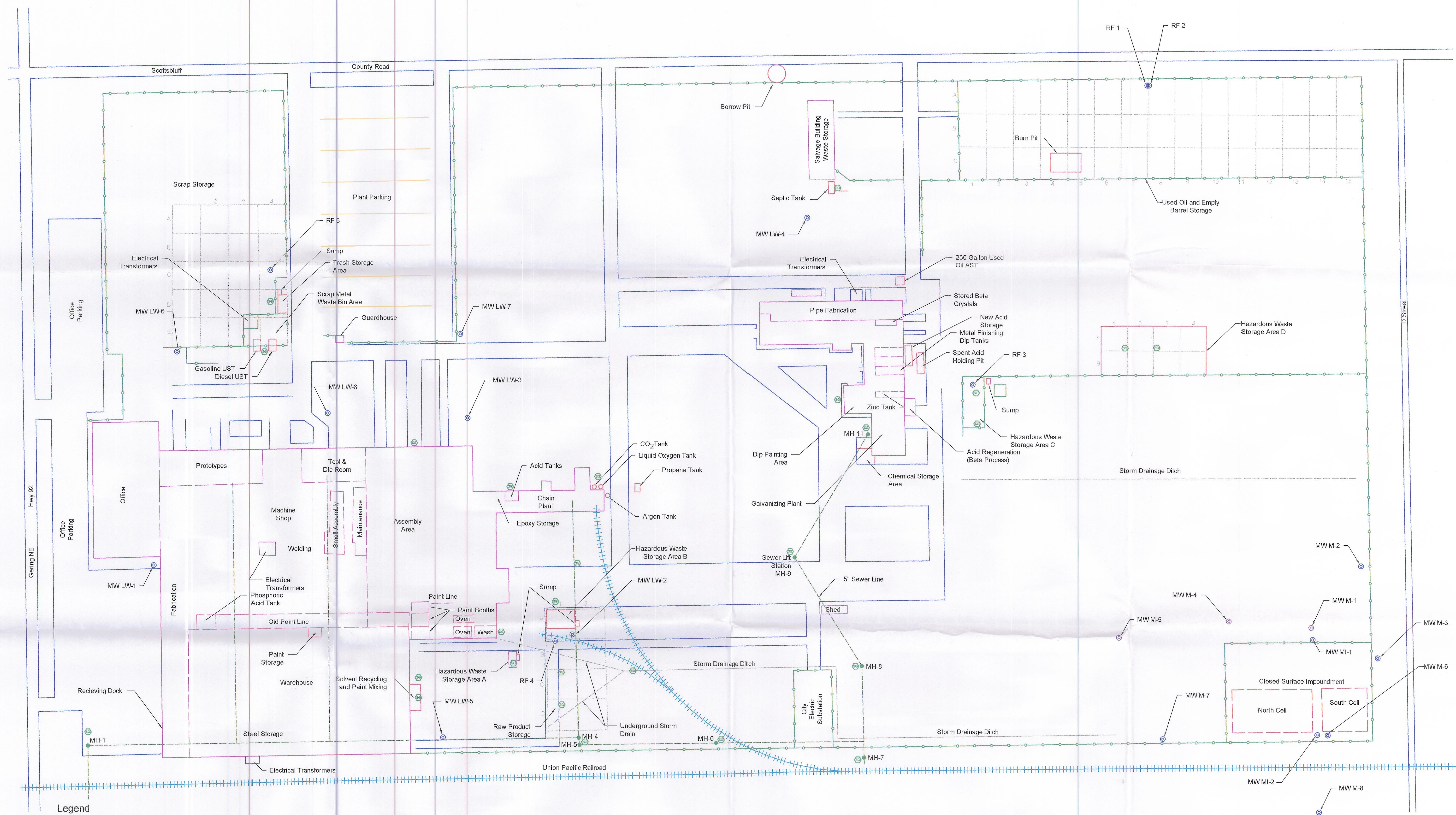
For each sludge sample, two 4-ounce glass jars will be filled. In addition, eight 40-mL VOA vials preserved with sodium bisulfate will be filled with about 5 grams of sludge, and two 4-ounce jars will be filled, for VOC analysis. Four of the VOA vials and one of the 4-ounce jars will be sent to the on-site laboratory for VOC and metals analysis. Two extra VOA vials will be submitted to the on-site laboratory because the sludge samples may prove to be a more difficult matrix to analyze. The remaining four VOA vials and one 4-ounce jar will be submitted for off-site VOC analysis. Two additional pre-weighed VOA vials filled with 5 mL of methanol will also be filled with five grams of soil. These methanol-filled vials will be submitted to the off-site laboratory and will serve as mid-concentration range samples for VOC analysis. Two 4-ounce jars filled with sludge samples will also be submitted to an off-site laboratory for analysis for metals (EPA Methods 6010B), TCLP metals (EPA Method 1311), and pH (EPA Method 9040B). All sample containers will be labeled using EPA laboratory procedures, then archived in a sample cooler at 4 °C.

Wastewater samples for the on-site laboratory will be collected in four VOA vials which will be filled with 10 mL of wastewater measured with a 10-mL plastic syringe. Two extra VOA vials will be filled for wastewater analysis because this matrix may be difficult to analyze and may also require multiple dilutions. The partially-filled VOA vials will be capped and the tops will be crimped in place by the sample collection team, to prevent loss of VOCs.

Wastewater samples for VOC analysis by the off-site laboratory will be collected into four, 40-mL VOA vials, preserved with hydrochloric acid to a pH of 2, and iced to a temperature of 4 °C. The following additional analyses will be performed in the off-site laboratory. Samples collected for total metals will be collected in a 1-liter cubitainer, preserved with nitric acid to a pH of 2, and iced to a temperature of 4 °C. All samples analyzed for dissolved metals will first be filtered through a 0.45 micron filter, transferred into a 1-liter cubitainer, preserved with nitric acid to a pH of 2, and iced to a temperature of 4 °C. Samples collected for pH analysis (EPA Method 9040 B) will be collected in 1-liter polyethylene containers with no preservative.

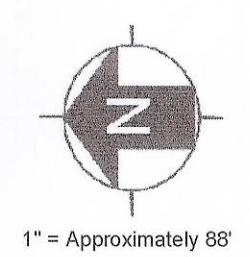
2.1.6 Soil Gas Sampling

Investigation of potential source areas of VOCs will be conducted via soil gas sampling at those locations as shown on Figure 7. At least one soil gas sample will be collected at each potential source property, with sample locations to be determined in the field. Suspected source areas include on-site manholes and



- Legend**
- Edge of pavement
 - Sewer line
 - Manhole
 - ⊙ Monitoring well
 - ▭ Building
 - Fence
 - Railroad tracks
 - TOC Elevation at top of casing
 - GRD Elevation at ground surface
 - ⊙ Soil gas sample
- Note: All elevations are +3800 feet above sea level

Source: Modified From Lockwood Corporation Facility Layout



1" = Approximately 88'

Agromac-Lockwood Facility Gering, Nebraska	
FIGURE 7 Proposed Soil Gas Sampling Location Map	
	Tetra Tech EM Inc.
Date: 12/10/01	Drawn By: Colin Willis Project No: G8011 L.01.0008.10

lift stations (eight locations) in the sanitary sewer system, along the eastern side of the northern manufacturing building (three locations), and one to two samples from each of the hazardous waste storage pads, two from the raw product storage area, two from the solvent recovery area, two from the scrap metal waste bin area, two near or downgradient from the paint line in the manufacturing building, one from around the septic tank at the salvage building, and one near the dip painting area on the northern side of the galvanizing building. Exact sample locations may be biased, based on areas where releases may have occurred or where access is most feasible. Soil gas sampling locations will be based on results of groundwater sampling, identifying the source areas of VOC contamination. The proposed soil gas sampling locations are summarized in Table 8.

The Tetra Tech START field team will collect the soil gas samples using a Geoprobe®. All Geoprobe® samples will be collected in accordance with Region 7 EPA/ENSV SOP 4230.7A, "Geoprobe® Operations." The Geoprobe® will be used to drive 4-foot lengths of 3/4-inch inside diameter pipe. The bottom (first) pipe will be fitted with an expendable drive tip and a threaded expendable drive tip holder.

The pipe will be advanced to a depth just above the water table. Once the pipe has been advanced to the proper depth, the top of the pipe string will be pulled up several inches to release the expendable drive point and allow soil vapors to enter the bottom pipe. A length of polyethylene tubing threaded with a stainless steel post-run tubing (PRT) adaptor will be threaded onto the expendable drive tip holder. The PRT method of soil gas collection allows only soil gas vapors from below the pipe string to enter the sampling train, and exposes the sample only to dedicated polyethylene tubing. The polyethylene tubing will then be connected to a Tygon® adaptor leading to a vacuum pump. Gas flow will be monitored with a vacuum gauge to ensure that an adequate flow can be obtained. About 2 to 5 liters of air will be evacuated from the soil gas "well" prior to collecting a sample for analysis. Samples will be collected in a glass bulb or Teflon bag connected to the evacuation line. Maximum holding time for these samples is 24 hours. At least two equipment blanks will be collected by drawing clean ambient air through a decontaminated expendable point holder, PRT adaptor, and clean polyethylene tubing.

All soil gas samples will be analyzed on site using direct injection and a portable gas chromatograph. Because soil gas analysis is being used as a screening tool, no confirmation soil gas samples will be collected for off-site analysis by the EPA Region 7 laboratory. If elevated concentrations of VOCs are detected during soil gas sampling, a soil sample may be collected from that location for VOC analysis in the MLP and the off-site laboratory. The Tetra Tech START MLP will conduct the on-site analysis

TABLE 8
PROPOSED SOIL GAS SAMPLING SUMMARY
AGROMAC-LOCKWOOD OPERATING UNIT NUMBER 2, GERING, NEBRASKA

Location	Estimated Number of Samples	On-site Laboratory
		VOCs
Manholes, Sanitary Sewer	8	8
East side, Manufacturing Building	3	3
Hazardous Waste Pads A,B,C, and D	6	6
Raw Product Storage Area	2	2
Solvent Recovery Area	2	2
Scrap Metal Waste Bin Area	2	2
Septic Tank (Salvage Building)	1	1
Dip Painting Area (Galvanizing Building)	1	1
Near Paint Line (Manufacturing Building)	2	2
Background ¹	NA	NA
Field Duplicates	2	3
Equipment Blanks	2	2
MS/MSD	1	1
Totals	33	33

Notes: Numbers in parentheses indicates the EPA analytical method
VOCs = Volatile Organic Compounds
MS/MSD = Matrix spike/matrix spike duplicate
NA = Not Applicable
¹ = Background sample not required

according to the "Standard Operating Guideline for Volatile Organic Compounds in Soil Gas by Direct Injection and Gas Chromatography" (see Appendix C). Soil gas analytes will include the following compounds: trichloroethene, tetrachloroethene, and 1,1,1-trichloroethane which have been previously detected in soil and groundwater sampling at the site.

2.1.7 Global Positioning System (GPS) Surveying

A backpack-mounted GPS receiver will be used to record all soil and groundwater sampling locations. The GPS unit should be accurate to within 5 feet. The GPS will be operated in accordance with EPA SOP 2110.3A. The GPS will also be used to record the boundaries of the soil sampling grids used during field activities. This will assist in future soil removal activities. The GPS unit will be operated in a coordinate system consistent with those used in the site base map and according to manufacturers instructions. This will facilitate the preparation of sampling location maps.

2.1.8 Investigation-derived Waste Handling and Decontamination Procedures

Investigation-derived waste (IDW) will consist of expendable sampling equipment, personal protective equipment (PPE), excess soil from acetate liners, and decontamination water. All PPE (including Tyvec® suits, respirator cartridges, rubber booties, and nitrile gloves), purge water, and empty acetate liners will be collected and disposed of properly by Tetra Tech START.

Excess soil from Geoprobe® sampling activities, and decontamination and purge water will be disposed of on site if no contamination is detected by the on-site laboratory. Archived samples will be retained in the MLP for possible re-analysis until the final report for the project is completed.

Personnel and equipment will be decontaminated in accordance with the site-specific Health and Safety Plan (prepared by Tetra Tech START) and EPA SOP 2231.6A, Sampling Equipment Decontamination. Nonexpendable sampling equipment will be decontaminated prior to sample collection at the first location and between all sampling locations thereafter. Disposable equipment will be used, whenever possible, to reduce or eliminate the risk of cross-contamination. Sampling and decontamination methods have been designed to minimize unnecessary generation of IDW. The Tetra Tech START OSC will be responsible for using sound, professional judgment when making decisions regarding IDW.

2.2 SAMPLE SUMMARY

A minimum of 353 soil samples are proposed during the ISI. The specific distribution of soil sampling by source area was summarized in Table 2. Samples will be collected at various depths to delineate the extent of metals contamination at various sources on site. Four background soil borings will also be advanced with four sample intervals. In addition, 36 field duplicate samples, 10 equipment rinsates and 18 matrix spikes/matrix spike duplicates (MS/MSD) will be collected. If significant soil contamination is detected in the on-site laboratory, then additional soil samples will be collected to delineate the extent of soil contamination in the source areas.

A minimum of 52 groundwater samples will be collected, including 22 from existing monitoring well locations, 17 from various domestic well locations, nine from Geoprobe® locations downgradient of suspected source areas, and in four upgradient background locations to be sampled using a Geoprobe®. In addition, seven field duplicate samples, two equipment rinsates, and three MS/MSDs will be collected.

Ten sludge and five waste water samples will be collected from the septic tanks and sumps plus one field duplicate sample and one MS/MSD for each matrix.

Twenty-seven soil gas samples, three field duplicates, two equipment blanks, and one MS/MSD sample will be collected.

There will also be one trip blank sample for each sample matrix, one for soil and one for water, in each cooler shipped off-site for VOC analysis. The rinsate blank samples will be prepared by sampling personnel. Commercial deionized water will be poured through non-dedicated sampling equipment directly into the sample container. Equipment rinsates will be collected on a daily basis and will be analyzed for all the analytical parameters. The field blank sample will be prepared on site by pouring deionized water directly into sample containers. A sample of the source water used to pour equipment rinsates will also be submitted to the off-site laboratory for analysis for all analytes sampled during this field effort. All QA samples are discussed in Section 2.5 of this QAPP.

2.3 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

All samples will be placed into the appropriate containers for analysis as described in Section 2.1. All samples will be packaged and preserved according to the Region 7 SOP 2420.6, Sample Container Selection, Preservation and Holding Times. Chain of custody (COC) and field documentation will follow SOPs 2420.4, Field COC for Environmental Samples, and 2420.5, Identification, Documentation and Tracking of Samples.

COC for samples will be maintained by Tetra Tech START until samples are relinquished to the off-site laboratory. Samples collected for analysis in the on-site laboratory will also be maintained on a COC form. All soil and water samples will be stored on ice to 4 °C in coolers until they are delivered to either the on-site or off-site laboratory. All sample documentation will be enclosed within each cooler. The samples will be transported by Tetra Tech START personnel or shipped to the off-site laboratory.

2.4 ANALYTICAL METHODS REQUIREMENTS

This section describes off-site laboratory procedures to be implemented during this ISI. Water samples will be analyzed for VOCs, according to EPA SW846 Method 8260 or EPA Method 524 in drinking water wells, total and dissolved metals using EPA SW846 Method 6010 B and 6020, respectively, TCLP metals using EPA Method 1311A, and pH in accordance with EPA SW846 Method 9040B.

2.5 QC ELEMENTS

The objective of QC samples is to provide the level of data quality required to support legal or compliance action. This section provides discussion of the QC program to be implemented for all sampling procedures, quantitative screening analyses, and formal analyses at a fixed laboratory.

2.5.1 Formal Laboratory QC Requirements

Off-site laboratory QC requirements will be followed in accordance with those specified by EPA definitive level data requirements in Region 7 EPA/ENSV SOP 3240.2C.

2.5.2 Field QC Samples

The following QC samples will be collected during the ISI:

- Duplicate samples
- Equipment rinsate samples
- Field blank
- Trip blank

Guidelines for collecting minimum QC samples are specified in EPA's "1987 Data Quality Objectives for Remedial Response Activities." Each QC sample is described in the following paragraphs.

Duplicate sample pairs will be assessed by calculating a relative percent difference (RPD) for each analyte detected in both samples. The RPD will be calculated as follows:

$$RPD = \left(\frac{X_2 - X_1}{(X_2 + X_1)/2} \right) * 100$$

where X_2 = original sample concentration
 X_1 = duplicate sample concentration

Field duplicate sample analysis will be evaluated by the following criteria. The advisory control limits for the RPD between paired field duplicates is 50 percent for all analytes. This only applies to compounds with concentrations at least five times the maximum detection limit (MDL). Because of the sensitivity of RPD calculations to low concentrations and the lowered method precision near MDLs, analytes with reported concentrations less than five times their respective MDLs will not be evaluated by these advisory control limits. If field duplicate samples produce non-detects, one-half of the MDL will be used as an estimated concentration. Target compounds in the field duplicate pairs exhibiting RPDs outside of the advisory control limits may indicate a problem with the sampling methodology. In these cases, the Tetra Tech START project manager (PM) and the EPA OSC will review this data and determine the usability of the affected data.

To assess the decontamination procedures used on the Geoprobe® sampling equipment, one equipment rinsate sample will be collected each day that soil and groundwater samples are collected. Equipment

rinsate samples will be collected by pouring deionized water through the soil and groundwater sampling apparatus and into the appropriate sample containers. A field blank sample will be collected for the water matrix. The field blank will assess whether any ambient environmental conditions present during the sample collection have the potential to impact the data quality of other samples collected under this QAPP. The field blank samples will be prepared by sampling personnel. The water sample will be prepared on site by pouring deionized water directly into sample containers. A sample of the source water used for equipment rinsates will be submitted to the off-site laboratory for analysis for all analytes sampled during this field effort. This sample will be collected by pouring deionized water from the source water used for equipment rinsates into sample containers at a clean, off-site location. This sample will be used to verify that no contaminants are introduced into the equipment rinsate blanks from the deionized water used for the rinsate.

Lastly, soil and water trip blank samples prepared by the contract laboratory will be submitted with environmental samples. The trip blank samples will assess whether any cross-contamination of samples by VOCs occurred during sample shipment. The trip blank should be free of any contamination. Any detections in an equipment rinsate blank will result in the subsequent coding of the data produced from samples collected that day. The criteria for data coding and usability will follow the "blank rules" stipulated in the EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, Multi-media Concentration (OLM01.1) and Low Concentration Water (OLC01.1), EPA Document No. 540/R-94-013.

2.6 INSTRUMENT AND EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE REQUIREMENTS

For health and safety, and sample testing, a PID, a multi-gas meter for oxygen, and flammable gases will be used. Inspection, testing, and maintenance requirements will be performed in accordance with manufacturer's recommendations and approved laboratory procedures for all laboratory, geophysical, and water quality instruments used on site.

2.7 INSTRUMENT CALIBRATION AND FREQUENCY

For health and safety monitoring instrumentation, a PID and multi-gas detector will be calibrated in accordance with referenced SOPs and manufacturer's recommendations. Manufacturers

recommendations and approved laboratory procedures will be used for the testing and maintenance of all laboratory instruments, geophysical, and water quality instruments used on site.

2.8 INSPECTION AND ACCEPTANCE REQUIREMENTS FOR SUPPLIES AND CONSUMABLES

All sample containers will meet EPA criteria for chemical cleaning procedures for low-level chemical analysis. Sample containers shall have a Level II Certification from the manufacturer stating that the pre-cleaning criteria established by EPA in "Specifications and Guidance for Contaminant-free Sample Containers" have been met.

2.9 DATA ACQUISITION REQUIREMENTS

No analytical data from other sources will be used during this project.

2.10 DATA MANAGEMENT

Raw data will be maintained in the Tetra Tech START project file. Data management will be in accordance with EPA Region 7 SOP 2120.2A, Document Control, and SOP 2410.1B, LABO Analytical Data Management Procedures.

3.0 ASSESSMENT AND OVERSIGHT

3.1 ASSESSMENTS AND RESPONSE ACTIONS

Because of the short duration of this sampling event, no field audits of sampling procedures will be performed. Assessments and response actions pertaining to the analytical phases of the project are addressed in Region 7 EPA/ENSV SOPs 2430.12D and 2440.5B, and in the previously referenced analytical SOPs and methods. Those documents identify out-of-control conditions, responsibility for initiating corrective action, and what corrective steps should be taken.

3.2 REPORTS TO MANAGEMENT

Tetra Tech START will prepare a trip report documenting all field activities to be submitted to the EPA PM within 14 days of completion of the project field work. Tetra Tech START will also prepare an ISI report detailing the sampling activities performed, conduct analytical interpretation, and assess the need for future EPA removal or pre-remedial action at the site. The ISI report, which will include a removal site evaluation form, will be submitted to the EPA PM within 45 days of receipt of analytical results from the contract laboratory.

4.0 DATA VALIDATION AND USABILITY

4.1 DATA REVIEW, VALIDATION, AND VERIFICATION REQUIREMENTS

The data will be reviewed in accordance with EPA Region 7 SOPs 2430.12D and 2440.5B. EPA will be responsible for overall validation and final approval of the data in accordance with the project purpose and use of the data.

4.2 VALIDATION AND VERIFICATION METHODS

The data will be validated in accordance with EPA Region 7 SOP 2430.2C. "Review of Data Deliverables Packaged from a Contract Laboratory" by a Tetra Tech START chemist. The EPA PM will provide final review of the data for completeness.

4.3 RECONCILIATION

If data quality indicators do not meet the project's requirements, as outlined in the QAPP, the data may be discarded and at the EPA PM's discretion, resampling or reanalysis may be required.

5.0 REFERENCES

U.S. Environmental Protection Agency (EPA). 1996. "Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead." December.

EPA. 2000. "Region 9 Preliminary Remediation Goals (PRGs) Tables: What's New in 2000."